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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,127	12/01/2003	Myung Gyu Choi	P69338US0	1216
136	7590	01/28/2005	EXAMINER	
JACOBSON HOLMAN PLLC 400 SEVENTH STREET N.W. SUITE 600 WASHINGTON, DC 20004			TRINH, MICHAEL MANH	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 01/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/724,127

Applicant(s)

CHOI, MYUNG GYU

Examiner

Michael Trinh

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/01/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 2822

## DETAILED ACTION

\*\*\* This office action is in response to filing of the application on December 01, 2003.

Claims 1-3 are pending.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Puchner et al (6,342,429) taken with Shih et al (6,362,035).

Puchner teaches a method for forming a well in a semiconductor device comprising at least the steps of: forming a trench 260 in a semiconductor substrate using a patterned pad nitride film 204 as an etch mask (Figs 2A-2B; col 3, lines 30-50) so that a field region is opened; forming an oxide film 208 along the surface of the trench (Fig 2C; col 3, lines 58-67); performing an additional ion implantation process (col 3, line 63 through col 4, line 22) to form an additional ion implantation layer on the sidewalls of the trench (Fig 2D); filling the trench with an insulating material 220 to form a field oxide film (Fig 2E; col 4, lines 23-35); and removing the pad nitride film 204 and then forming a well 240/250 within the semiconductor substrate 200 by means of a well ion implantation process. Re claim 3, wherein the additional ion implantation process and the well ion implantation process use the same impurity ion of p-type dopant (col 4, lines 16-23; col 3, lines 63-67; col 4, lines 43-67).

Puchner already teaches a well ion implantation process, but lacks mentioning a subsequent annealing process.

However, Shih et al teach (at col 5, lines 24-34, 2-23; Figs 1g-1i), after implanting ions into the substrate to form the well, performing a subsequent annealing process to electrically activate the implanted ion impurities.

Art Unit: 2822

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the well of Puchner by performing an annealing process after the well ion implantation process, as taught by Shih. This is because at least of the desirability to electrically activate the implanted ion impurities.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puchner et al (6,342,429) and Shih et al (6,362,035), as applied to claims 1 and 3 above, and further of Fuse et al (4,918,027).

Puchner and Shih teach a method for forming a well in a semiconductor device as applied above to claims 1 and 3.

Puchner already teaches performing an additional ion implantation process into the trench, but lacks performing the ion implantation in a tilt of 3° to 10° with rotating the device 4 times.

However, Fuse teaches (at Figs 1-2; col 3, line 39 through col 4, line 68; col 1, lines 40-68) performing an ion implantation process into the trench having vertical sidewall surfaces, wherein the ion implantation is performed in a tilt angle of 8° with rotating the device 4 times.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the additional ion implantation process of Puchner by performing the ion implantation in a tilt angle of 8° with rotating the device 4 times, as taught by Fuse, when the isolation trench having vertical sidewall surfaces. This is because of the desirability and the necessary to introduce ion dopants into all sidewall surfaces of trench. Moreover, selecting of a tilt angle for ion implantation as taught by Fuse, which is within the range of applicant's claims, would have been obvious, involve routine optimization which has been held to be within the level of ordinary skill in the art, and would be an unpatentable modification, *In Re Aller* 104 USPQ 233,255 (CCPA 1955); *In re Waite* 77 USPQ 586 (CCPA 1948); *In Re Swanson* 56 USPQ 372 (CCPA 1942).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

Art Unit: 2822

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-15

A handwritten signature in black ink, appearing to read 'Michael Trinh', is positioned above the printed name.

Michael Trinh  
Primary Examiner